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Agency

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AERIAL PHOTOGRAPHIC ANALYSIS LCP CHEMICALS, INC., SITE

Linden, New Jersey

EPA Region 2

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AERIAL PHOTOGRAPHIC ANALYSIS
LCP CHEMICALS, INC., SITE

Linden, New Jersey

by

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Contract No. 68-C5-0065

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ENVIRONMENTAL SCIENCES DIVISION
NATIONAL EXPOSURE RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
LAS VEGAS, NEVADA 89193-3478

NOTICE

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ABSTRACT

This report presents the results of an aerial photographic analysis of the LCP Chemicals, Inc., site (CERCLIS ID# NJD001900281), covering approximately 10.5 hectares (26 acres) on the Tremley Point peninsula on the Arthur Kill, Union County, New Jersey. The analysis was conducted with ten selected dates of photographs spanning the period from 1940 through 1995. The U.S. Environmental Protection Agency, Region 2 Office requested this report to document observable past patterns of waste disposal activity and other conditions of environmental significance. Specifically, the report addresses the identification of sources of contamination, potential spill or leakage areas, drainage patterns, and historical photographic evidence of discharges into the natural drainage system.

A chemical processing plant was in place on the site by 1958 and contained railroad tank car loading racks, vertical and horizontal tanks, and an electric transformer yard. In 1967 a large light-toned probable deposit, was observed on the east side of the plant. In 1974 a large lagoon was constructed on the east side of the site. In 1976 the large lagoon was partially filled with dry material. In 1982 the large lagoon was replaced by a large mound. Several tanks were removed and a small lagoon was constructed on the north side of the former large lagoon. In 1990 additional tanks had been removed and the small lagoon was no longer observed. In 1995 the LCP Chemicals, Inc., site appeared to be non-operational.

The U.S. Environmental Protection Agency (EPA), Environmental Sciences Division, Landscape Ecology Branch in Las Vegas, Nevada, prepared this report for the EPA Region 2 Hazardous Waste Management Division in New York, New York, and the EPA Office of Emergency and Remedial Response in Washington, D.C.

CONTENTS

FIGURES

INTRODUCTION

This report presents the results of an aerial photographic analysis of the LCP Chemicals, Inc., site (CERCLIS ID# NJD001900281), situated on the Tremley Point Peninsula along the Arthur Kill, in Union County, New Jersey (Figures 1 and 2). The analysis was conducted with ten selected dates of photographs spanning the period from 1940 through 1995. The U.S. Environmental Protection Agency, Region 2 Office requested aerial photographic analysis support to document observable past patterns of waste disposal activity and other conditions of environmental significance. Specifically, this report addresses the identification of sources of contamination, potential spill or leakage areas, drainage patterns, and historical photographic evidence of discharges into the natural drainage system.

Collateral information and history of this facility which follows was obtained from the EPA Intranet Superfund web page. LCP Chemicals, Inc. purchased the 26-acre chlorine production facility in 1972 from GAF Corp., which had owned the facility since 1942. From 1972 to 1982 a mercury cell electrolysis process was used to produce chlorine, sodium hydroxide, and hydrochloric acid. A waste material, mercury-tainted brine sludge, was held on site in a brine sludge lagoon. Spillage, leakage, overflows, or discharges from this waste lagoon are reported to have reached the adjacent South Branch Creek. Production of this brine sludge waste material ceased in 1982 and the waste lagoon was closed, dewatered, and capped by 1984.

The LCP Chemicals, Inc., site covers 10.5 hectares (26 acres) and over the years of analysis contained several chemical storage tank areas and processing buildings. Aerial photographic analysis showed construction activity at the site was underway by 1951. By 1958 a facility was operational and contained railroad tank car loading racks, vertical and horizontal tanks, and an electric transformer yard. By 1967 a large, light-toned feature, a probable deposit, was observed on the east side of the site. By 1974 a large lagoon was constructed on the east side of the site. In 1976 the large lagoon was

partially filled with dry material. By 1982 the large lagoon was replaced by a large mound. Several tanks had been removed and a small lagoon was constructed on the north side of the former large lagoon. In 1990 additional tanks had been removed and the small lagoon was absent. By 1995 the LCP Chemicals, Inc., site no longer appeared operational.

In order to minimize the number of annotations on the overlay for each photograph once a feature has been described it will not be annotated on subsequent dates of photography unless an environmentally significant condition is observed in relation to it or it is needed as a reference location to describe a condition within the site.

A Glossary, defining features or conditions identified in this report, follows the Photographic Analysis section. Sources for all maps, aerial photographs, and collateral data used in the production of this report are listed in the References section. A list of all aerial photographs that were identified and evaluated for potential application to this study can be obtained by contacting the EPA Work Assignment Manager. Historical aerial photographs used in the analysis of this site have been digitally scanned and printed for use in this report. A transparent overlay with interpretative data is affixed to each of the digital prints. See the Methodology section for a discussion of the scanning and printing procedures.

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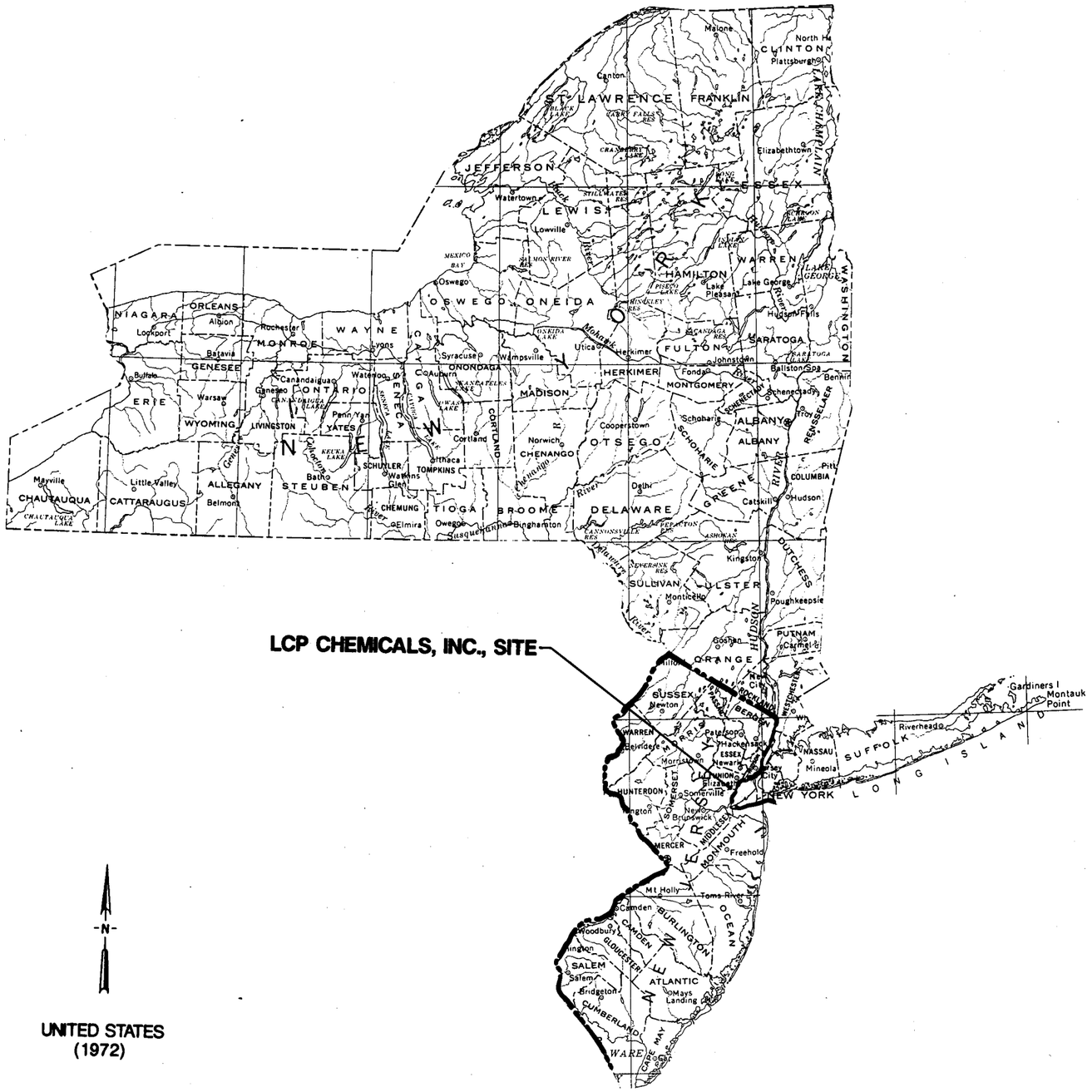

Figure 1. Study area location map, New Jersey (USGS 1972). Approximate scale 1:3,125,000.

Figure 2. Local study area location map, Arthur Kill, NY-NJ (USGS 1981). Scale 1:24,000.

METHODOLOGY

This report was prepared using a standard methodology that includes the following steps:

- data identification and acquisition,
- photographic analysis and interpretation, and
- graphics and text preparation.

These steps are described below. Subsections also address details related to specific kinds of analyses that may be required to identify environmental features such as surface drainage and wetlands. All operational steps and processes used to perform this work (including data identification and acquisition, photographic analysis and interpretation, and graphics and text preparation) adhere to strict QA/QC guidelines and standard operating procedures (SOPs). These guidelines and procedures are documented in the Master Quality Assurance Project Plan (QAPP) prepared for Remote Sensing Technical Support Contract No. 68-C5-0065 (LESAT 1998).

Data identification and acquisition included a search of government and commercial sources of historical aerial film for the study area. Photographs with optimal spatial and temporal resolution and image quality were identified for acquisition. In addition, U.S. Geological Survey (USGS) topographic maps were obtained to show the study area location and to provide geographic and topographic context.

To conduct this analysis, the analyst examined diapositives (transparencies) of historical aerial photographs showing the study area. Diapositives are most often used for analysis instead of prints because the diapositives have superior photographic resolution. They show minute details of significant environmental features that may not be discernible on a paper print.

A photographic analyst uses a stereoscope to view adjacent, overlapping pairs of diapositives on a backlit light table. In most cases, the stereoscope

is capable of various magnifications up to 60 power. Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the area of interest. The stereoscope enhances the photo interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of natural and cultural features.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include shadow, tone, color, texture, shape, size, pattern, and landscape context of individual elements of a photograph. The photo analyst identifies objects, features, and "signatures" associated with specific environmental conditions or events. The term "signature" refers to a combination of components or characteristics that indicate a specific object, condition, or pattern of environmental significance. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst as well as background information from collateral sources (e.g., site maps, geologic reports, soil surveys) are critical factors employed in the photographic analysis.

The analyst records the results of the analysis by using a standard set of annotations and terminology to identify objects and features observed on the diapositives. Significant findings are annotated on overlays attached to the photographic or computer-reproduced prints in the report and discussed in the accompanying text. Annotations that are self-explanatory may not be discussed in the text. The annotations are defined in the legend that accompanies each print and in the text when first used.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable, and possible identifications. When the analyst believes the identification is unmistakable (certain), no qualifier is used. Probable is used when a limited number of discernible characteristics allow the analyst to be reasonably sure of a particular identification. Possible is used when only a few characteristics are discernible, and the analyst can only infer an identification.

The prints in this report have been reproduced, either by photographic or computer methods, from the original film. Reproductions are made from the original film and may be either contact (the same size) prints or enlargements, depending on the scale of the original film. Any computer-produced prints used in this report are generated from scans of the film at approximately 1,300 dots per inch (dpi) and printed at 720 dpi. Although the reproductions allow effective display of the interpretive annotations, they may have less photographic resolution than the original film. Therefore, some of the objects and features identified in the original image and described in the text may not be as clearly discernible on the prints in this report.

Study area boundaries shown in this report were determined from aerial photographs or collateral data and do not denote legal property lines or ownership.

Surface Drainage

The surface drainage analysis produced for this report identifies the direction and potential path that a liquid spill or surface runoff would follow based on the topography of the terrain and the presence of discernible obstacles to surface flow. The analyst determines the direction of surface drainage by stereoscopic analysis of the aerial photographs and by examining USGS topographic maps. Site-specific surface drainage patterns are annotated on the map or photo overlay. Where the direction of subtle drainage cannot be determined, an indeterminate drainage line symbol is used. Regional surface flow is ascertained from the USGS topographic maps.

PHOTOGRAPHIC ANALYSIS

Analysis of the USGS Arthur Kill, NY-NJ topographic quadrangle determined the elevation of the site is less than 3 meters (10 feet) above sea level and approximately 487 meters (1600 feet) east of the bank of the Arthur Kill.

APRIL 28, 1940 (FIGURE 3)

Photographic analysis reveals the site in 1940 is undeveloped and the LCP Chemicals, Inc., site has not been established. The site is situated within an industrial area of Tremley Point. The site is adjacent to the Arthur Kill. There is an industrial facility to the north and an oil storage tank farm to the south of the site. The site boundary annotated on the photograph is based on the approximate size of the LCP Chemicals, Inc., site as observed on a 1995 photograph.

Regional drainage flows east into the Arthur Kill. Channelized drainage ditches have been dug next to and across portions of the site. A culvert under a railroad track allows runoff in the drainage ditch (D1) to leave the site and flow east into the Arthur Kill. Portions of the west bank of the Arthur Kill are in the process of being filled.

INTERPRETATION CODE

BOUNDARIES AND LIMITS

- FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- FENCE
- STUDY AREA

DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

- VEHICLE ACCESS
- RAILWAY

SITE FEATURES

- BERM/DIKE
- STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 3. LCP Chemicals, Inc., site, April 28, 1940. Approximate scale 1:4,300.

APRIL 20, 1951 (FIGURE 4)

There are no structures, buildings, or tanks on the site. Probable construction supplies and building materials are observed on the north side of drainage ditch D1. Since 1940 a railroad marshalling yard has been completed on the western side of the site. A vertical tank (VT) and a tall structure have been constructed on the south side of ditch D1.

A probable burn area and fill area (FL) are outside and northwest of the site. A cloud of smoke hangs over this probable burn area and the northwest portion of the site. Drainage from this northwest area flows across the site via ditches that connect to ditch D1.

Drainage continues to leave the site but the course of ditch D1 has been modified by a box culvert, still under construction, in the central portion of the site. The ditch D1 also appears to receive runoff from the industrial plant and fill areas northeast of the site. A dark-toned plume is visible at the mouth of ditch D1 as its contents flow into the Arthur Kill.

INTERPRETATION CODE

BOUNDARIES AND LIMITS

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DRAINAGE

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SITE FEATURES

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Figure 4. LCP Chemicals, Inc., site, April 20, 1951. Approximate scale 1:4,600.

NOVEMBER 20, 1958 (FIGURE 5)

An industrial plant is under construction in the north portion of the site. The facility contains four buildings (B1 through B4), two railroad tank car loading racks, a group of 12 vertical storage tanks, a separate group of three vertical storage tanks, and two horizontal storage tanks (HT). An electrical transformer yard has been constructed on the western portion of the site. A large mound of dark-toned material is in the northeast portion of the site. The ground adjacent to the northeast horizontal storage tanks has a dark tone suggesting possible stain (ST) from past spillage or leakage. The presence of pipeage, storage or processing tanks, a railroad tank car loading rack, an electrical transformer yard for power, and location of the site adjacent to industrial facilities suggests the site is a probable chemical production plant.

Since 1951 a portion of the railroad marshalling yard on the southwest portion of the site has been removed. A vertical storage tank and a large building (B5) have been constructed at this location. Improved photo resolution allows the structure adjacent to the vertical storage tank in the south-central portion of the site to be identified as a tall building.

No smoke is observed at the former probable burn area noted in 1951 outside and northwest of the site. A large group of probable 55-gallon drums (DR) is now visible in this area. The area north of these probable drums is being leveled with fill; however, standing liquid is still in this area.

Drainage ditch D1 continues to flow across the site and transports runoff from the former burn area. A dark-toned plume is visible at the mouth of ditch D1 as it discharges into the Arthur Kill. The areal extent of the plume has greatly expanded to the north, east, and south since the 1951 photograph.

INTERPRETATION CODE

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Figure 5. LCP Chemicals, Inc., site, November 20, 1958. Approximate scale 1:4,500.

MAY 4, 1963 (FIGURE 6)

Five new buildings (B6 through B10) have been constructed and three vertical and four horizontal storage or processing tanks have been added. The large mound of dark-toned material visible in 1958 is absent. The southern portion of the site which has been filled, graded, and leveled now contains two new buildings (B9 and B10) and six vertical tanks. The vertical tank and tall building observed at this location in 1958, are absent. Two cooling towers have been built near this southern location of the plant.

A portion of drainage ditch D1 is no longer visible and the box culvert under construction in 1958 has evidently been completed and covered. As a result of construction activity within the site boundary a portion of drainage ditch D1 has probably been piped underground. However, the eastern portion of drainage ditch D1 is above ground, visible, and continues to transport runoff. A faint, dark-toned plume is discernible at the mouth of this ditch as it empties into the Arthur Kill. The areal extent of this plume is smaller than the plume noted on the 1958 photograph.

Light- and dark-toned ground stains are observed in the northern portion of the chemical plant, possibly suggesting past spillage or leakage. Potential contaminants associated with this leakage or spillage could be transported into drainage ditch D1 via rainwater runoff, and reach the Arthur Kill.

INTERPRETATION CODE

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Figure 6. LCP Chemicals, Inc., site, May 4, 1963. Approximate scale 1:4,400.

APRIL 30, 1967 (FIGURE 7)

Poor photo resolution precludes a detailed analysis of conditions at the chemical plant in 1967. Analysis of the photograph shows the chemical plant continues to operate. No significant new construction is discerned. Several buildings (B1, B6, B7, and B10) have been annotated as reference locations.

A widespread light-toned ground stain is discerned in the southern portion of the site. A large probable deposit of light-toned material is discerned on the east side of the site. The curved shape of this probable deposit appears more like a berm rather than a stockpile.

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Figure 7. LCP Chemicals, Inc., site, April 30, 1967. Approximate scale 1:6,400.

APRIL 11, 1974 (FIGURE 8)

Since 1968 the chemical plant has undergone new construction with the addition of new buildings (B11 through B13) as well as new vertical and horizontal tanks used either for storage or for processing. Tank trucks are also observed within the facility.

The course of drainage ditch D1 has been altered since 1967. A light-toned plume is visible at the mouth of drainage ditch D1. The previously observed plumes (1951, 1958, and 1963) from drainage ditch D1 were dark-toned.

A liquid-filled lagoon (LG1/SL) has been constructed on the east side of the site. A bottom lining material could not be observed in this lagoon.

Standing liquid is visible in the northern portion of the site; a light-toned stain was observed at this approximate location in 1963. Accumulation of probable debris piles are observed along the southern perimeter of the site.

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Figure 8. LCP Chemicals, Inc., site, April 11, 1974. Approximate scale 1:4,500.

APRIL 17, 1976 (FIGURE 9)

The LCP Chemicals, Inc., site continues to be operational. One ground stain is noted in the northern portion of the site. The probable debris noted in 1974 is absent.

A large excavated trench (TR) is on the west side of the railroad tank car loading racks area. The trench occupies a portion of the course of drainage ditch D1, as observed in 1963. A deposit near the south end of this trench is probable earth spoil.

A storage tank farm has been constructed along the west bank of the Arthur Kill, outside the east side of the plant. The eastern portion of the drainage ditch D1 divides this tank farm into two portions. A pipeline bridge has been built across this ditch and poses a potential threat to the Arthur Kill from rupture or leakage.

The lagoon (LG1) on the east side of the site has received a large deposit of light-toned dry material, possibly fill. The amount of visible standing liquid in the lagoon is significantly less than the amount visible in 1974.

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Figure 9. LCP Chemicals, Inc., site, April 17, 1976. Approximate scale 1:4,200.

NOVEMBER 7, 1982 (FIGURE 10)

The LCP Chemicals, Inc., site continues to be operational. The large excavated trench observed in 1976 has been filled and leveled. Nine vertical storage or processing tanks have been removed from the east side of the chemical plant. Twelve new vertical tanks are observed on the west side of the plant near the railroad tank car loading racks area. One vertical tank has been constructed south of building B7.

A small lagoon containing standing liquid (LG2/SL) has been constructed on the north side of the former large lagoon LG1. The former large lagoon LG1 has been filled with a dry, medium-toned material that forms a large mound.

A light-toned possible stain is seen in the western portion of the site. A larger area of light-toned material is seen located outside and adjoining the northwestern corner of the site.

INTERPRETATION CODE

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Figure 10. LCP Chemicals, Inc., site, November 7, 1982. Approximate scale 1:4,000.

JUNE 22, 1990 (FIGURE 11)

The LCP Chemicals, Inc., site appears to remain operational. Railroad tank cars (not annotated) are visible at the loading racks. Since 1982 twelve vertical tanks have been removed near the railroad tank car loading racks area.

A secondary containment wall has been constructed around a group of vertical tanks in the northeast corner of the site. No ground stains are discernible.

The small lagoon (LG2) observed in 1982 has been removed and the location has been graded and leveled. The former large lagoon LG1 is absent and a medium-toned large mound of material occupies this location. This large mound has been graded and contoured.

INTERPRETATION CODE

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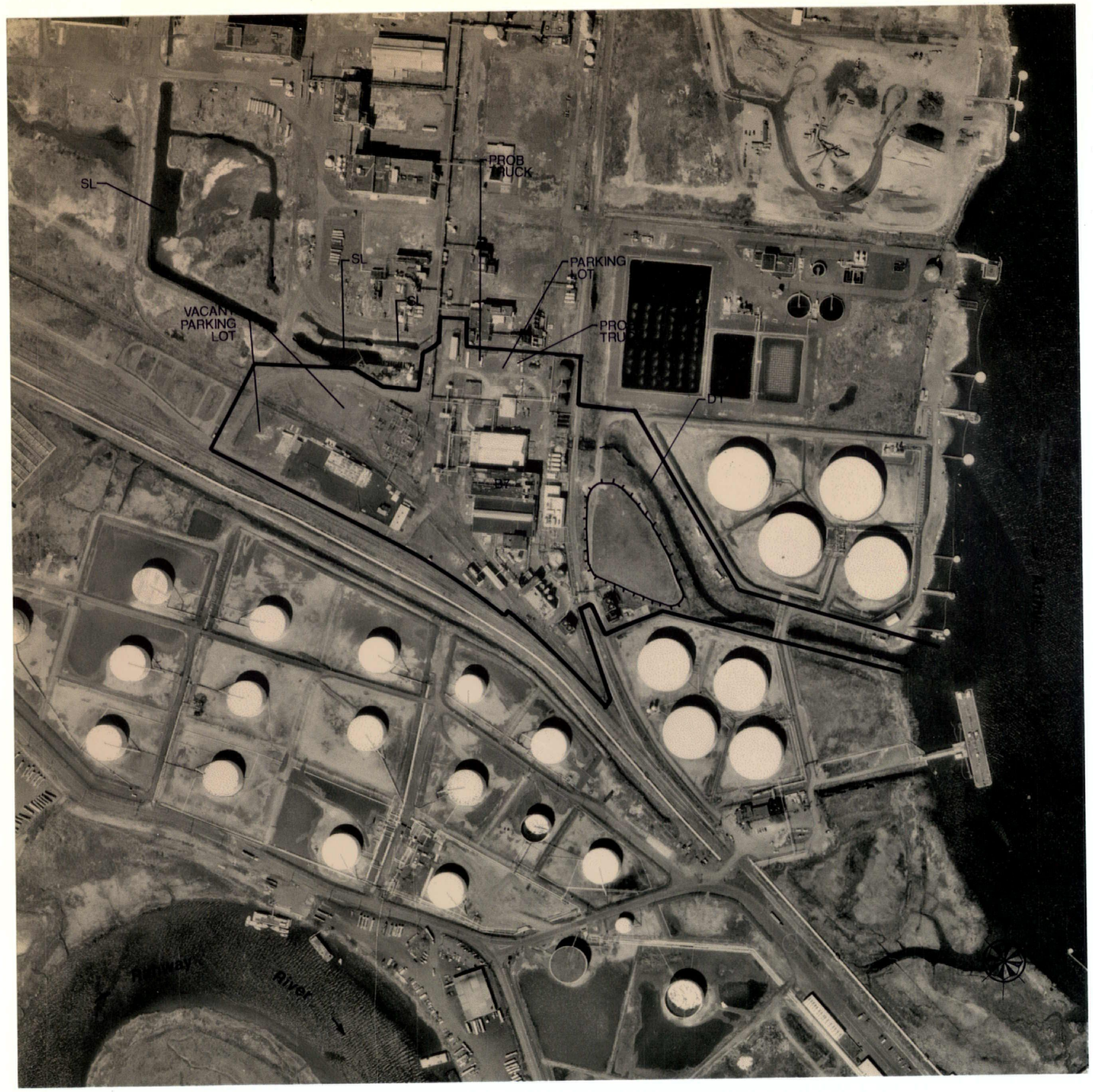
Figure 11. LCP Chemicals, Inc., site, June 22, 1990. Approximate scale 1:4,300.

APRIL 3, 1995 (FIGURE 12)

The LCP Chemicals, Inc., site appears non-operational. There are no railroad tank cars or tank trucks visible at the loading racks. There are no discernible vehicles and only two probable trucks noted within the plant and associated parking lots.

The drainage ditch D1 continues to flow into the Arthur Kill and no discernible plume is observed from this ditch.



INTERPRETATION CODE

BOUNDARIES AND LIMITS

- FENCED SITE BOUNDARY
- UNFENCED SITE BOUNDARY
- FENCE
- STUDY AREA

DRAINAGE

- DRAINAGE
- FLOW DIRECTION
- INDETERMINATE DRAINAGE

TRANSPORTATION/UTILITY

- VEHICLE ACCESS
- RAILWAY

SITE FEATURES

- BERM/DIKE
- STANDING LIQUID
- SL STANDING LIQUID
- EXCAVATION, PIT (EXTENSIVE)
- MOUNDED MATERIAL (EXTENSIVE)
- MM MOUNDED MATERIAL (SMALL)
- CR CRATES/BOXES
- DR DRUMS
- HT HORIZONTAL TANK
- PT PRESSURE TANK
- VT VERTICAL TANK
- CA CLEARED AREA
- DG DISTURBED GROUND
- FL FILL
- IM IMPOUNDMENT
- LG LAGOON
- OF OUTFALL
- SD SLUDGE
- ST STAIN
- SW SOLID WASTE
- TR TRENCH
- VS VEGETATION STRESS
- WD WASTE DISPOSAL AREA
- WV WETLAND VEGETATION

Figure 12. LCP Chemicals, Inc., site, April 3, 1995. Approximate scale 1:4,600.

GLOSSARY

Dark-, Medium-, or Light-Toned - Tones of features in question are compared with the darkest and lightest tones of gray (if using B&W photography) on the print.

Debris - The remains of anything that can be identified as being broken down, destroyed, demolished, or dismantled.

Drums (DR) - Metal cylinders used for the storage, transportation, or disposal of materials.

Fill (FL) - Earth, stones, or other material that is used to build up the level of an area of ground.

Lagoon (LG) - A liquid containment area that is apparently used for waste storage, disposal and/or treatment. A lined lagoon has an artificial barrier or liner to prevent migration of waste material into the soil.

Solid Waste (SW) - Any garbage, refuse, or sludge from a waste treatment, water supply treatment plant, or air pollution control facility, and other discarded material, including solid or semi-solid material resulting from industrial, commercial, mining, and agricultural operations, and from community activities; does not include solid or dissolved material in domestic sewage, or solid or dissolved materials in irrigation return flows or industrial discharges.

Spoil - Earth and rock excavated or dredged, as with surface mining, road construction, and harbor dredging.

Stain (ST) - A residue or discoloration resulting from a spill, discharge, or removed/dispersed materials.

Standing Liquid (SL) - A small, shallow, temporary collection of liquid, not necessarily waste. Not to include liquid contained in impoundments, trenches, pits, etc.

Tanks - Vertical tanks (VT), horizontal tanks (HT), pressure tanks (PT), tank farms, and solid waste management units. A large receptacle, container, or structure for holding liquid or gas.

REFERENCES

MAPS

Source[a]	Figure	Name	Scale	Date
USGS	1	United States	1:2,500,000	1972
USGS	2	Arthur Kill, NY-NJ	1:24,000	1981

COLLATERAL INFORMATION

EPA. 1999. USEPA Intranet web page: www.epa.gov/superfund/sites/npl/nar1495.htm.

LESAT (Lockheed Environmental Systems & Technologies Co.). 1998. Master Quality Assurance Project Plan. Prepared for EPA Environmental Sciences Division. Contract 68-C5-0065. Las Vegas, Nevada.

AERIAL PHOTOGRAPHS

Photo source[a]	Figure[b]	Date of acquisition	Original scale	Film type[c]	Mission I.D.	Source frame #
ADR	3	04-28-40	1:20,000	B&W		23-150
ASCS		09-19-47	1:20,000	B&W	CNA	3D-04
EPA	4	04-20-51	1:30,000	B&W	EPIC	14213
ASCS		05-02-57	1:20,000	B&W	CNA	8R-9
AVP	5	11-20-58	1:24,000	B&W	926	5-110
RAS		04-03-59	1:18,000	B&W	JER	3W-90
ASCS	6	05-04-63	1:20,000	B&W	CNA	1DD-69
AVP	7	04-30-67	1:75,000	B&W	1630	4-165
AVP	8	04-11-74	1:19,000	B&W	2063	5852
RAS	9	04-17-76	1:12,000	B&W	UN	4-3
MKHD		09-09-77	1:12,000	B&W	EPI	5024
NOS		06-30-78	1:36,000	B&W		4849
RAS	10	11-07-82	1:12,000	B&W	24-1953	9-89
MKHD		03-23-86	1:60,000	B&W	JSS	869
RAS	11	06-22-90	1:14,300	B&W		90-767
USGS		03-11-91	1:60,000	CIR	NAPP	131
USGS		03-29-95	1:60,000	CIR	NAPP	158
ADR	12	04-03-95	1:20,400	B&W	KAS94	4800

[a]ADR Aerial Data Reduction Association, Pennsauken, New Jersey
ASCS U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Salt Lake City, Utah
AVP Aerial Viewpoint, Inc., Spring, Texas
EPA U.S. Environmental Protection Agency, Environmental Sciences Division, Las Vegas, Nevada
MKHD Markhurd, Minneapolis, Minnesota
NOS National Ocean Service, Coast and Geodetic Survey, Washington, D.C.
RAS Robinson Aerial Surveys, Inc., Newton, New Jersey
USGS U.S. Department of Interior, U.S. Geological Survey, Washington, D.C.

[b]Photographs listed with no figure number were analyzed but not placed in this report because no significant features or changes had occurred since the previous photographs

[c]B&W Black-and-white
CIR Color Infrared